

WHAT IS CLAIMED IS:

1. An engine exhaust cleaning device comprising:  
a particulate matter filter configured to collects particulate matter from exhaust gas in an exhaust passage;
- 5 a regeneration processing section configured to execute regeneration processing that raises temperature of the particulate matter filter to remove the particulate matter collected in the particulate matter filter by combustion of the particulate matter collected in the particulate matter filter; and  
an idling speed raising section configured to raise the engine idling speed when the  
10 engine idles during the regeneration processing of the particulate matter filter by the regeneration processing section.
2. The engine exhaust cleaning device recited in claim 1, further comprising  
a fuel cut recovery engine speed processing section configured to raise a fuel cut  
15 recovery engine speed during the regeneration processing of the particulate matter filter by the regeneration processing section.
3. The engine exhaust cleaning device recited in claim 1, wherein  
the idling speed raising section is further configured to raise the engine idling  
20 speed for a prescribed amount of time when the engine idles during the regeneration processing of the particulate matter filter, and after the prescribed amount of time has elapsed, returns the engine idling speed to a normal idling speed value, when the engine idles during the regeneration processing of the particulate matter filter.
- 25 4. The engine exhaust cleaning device recited in claim 1, wherein  
the regeneration processing section includes an accumulated particulate quantity  
detecting section configured to detect the quantity of particulate matter that has  
accumulated within the particulate matter filter to determine regeneration timing to  
regenerate the particulate matter filter when an accumulated particulate quantity reaches a  
30 first prescribed quantity.

5. The engine exhaust cleaning device recited in claim 4, wherein  
the accumulated particulate quantity detecting section includes  
a filter pressure difference detecting sensor configured to detect a pressure  
difference across the particulate matter filter,  
5 an exhaust gas flow rate detecting section configured to detect an exhaust gas  
flow rate, and  
an accumulated particulate quantity computing section configured to compute  
the accumulated particulate quantity that has accumulated in the  
particulate matter filter based on the filter pressure difference detected by  
10 the filter pressure difference detecting sensor and the exhaust gas flow rate  
detected by the exhaust gas flow rate detecting section, and  
the regeneration processing section is further configured to determine the  
regeneration timing to regenerate the particulate matter filter by comparing the accumulated  
particulate quantity computed by the accumulated particulate quantity computing section  
15 with the first prescribed quantity.

6. The engine exhaust cleaning device recited in claim 4, wherein  
the regeneration processing section is further configured to end the regeneration  
processing of the particulate matter filter by the regeneration processing section by  
20 comparing the accumulated particulate quantity with a second prescribed quantity that is  
less than the first prescribed quantity .

7. The engine exhaust cleaning device recited in claim 1, wherein  
the regeneration processing section is further configured to increase the  
25 temperature of the exhaust gas by adjusting at least one of the following: a timing of a  
main fuel injection used for controlling the engine torque, a timing and quantity of a post  
fuel injection executed after the main fuel injection, a cross sectional area of an air intake  
passage opening, a supercharging pressure produced by a supercharger, and a flow rate of  
exhaust gas recirculated from the an exhaust passage to an air intake passage.

8. The engine exhaust cleaning device recited in claim 2, wherein  
the idling speed raising section is further configured to raise the engine idling  
speed for a prescribed amount of time when the engine idles during the regeneration  
processing of the particulate matter filter, and after the prescribed amount of time has  
5 elapsed, returns the engine idling speed to a normal idling speed value, when the engine  
idles during the regeneration processing of the particulate matter filter.

9. The engine exhaust cleaning device recited in claim 8, wherein  
the regeneration processing section includes an accumulated particulate quantity  
10 detecting section configured to detect the quantity of particulate matter that has  
accumulated within the particulate matter filter to determine regeneration timing to  
regenerate the particulate matter filter when an accumulated particulate quantity reaches a  
first prescribed quantity.

15 10. The engine exhaust cleaning device recited in claim 9, wherein  
the accumulated particulate quantity detecting section includes  
a filter pressure difference detecting sensor configured to detect a pressure  
difference across the particulate matter filter,  
an exhaust gas flow rate detecting section configured to detect an exhaust gas  
20 flow rate, and  
an accumulated particulate quantity computing section configured to compute  
the accumulated particulate quantity that has accumulated in the  
particulate matter filter based on the filter pressure difference detected by  
the filter pressure difference detecting sensor and the exhaust gas flow rate  
detected by the exhaust gas flow rate detecting section, and  
25 the regeneration processing section is further configured to determine the  
regeneration timing to regenerate the particulate matter filter by comparing the accumulated  
particulate quantity computed by the accumulated particulate quantity computing section  
with the first prescribed quantity.

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11. The engine exhaust cleaning device recited in claim 9, wherein  
the regeneration processing section is further configured to end the regeneration  
processing of the particulate matter filter by the regeneration processing section by  
comparing the accumulated particulate quantity with a second prescribed quantity that is  
5 less than the first prescribed quantity .

12. The engine exhaust cleaning device recited in claim 8, wherein  
the regeneration processing section is further configured to increase the  
temperature of the exhaust gas by adjusting at least one of the following: a timing of a  
10 main fuel injection used for controlling the engine torque, a timing and quantity of a post  
fuel injection executed after the main fuel injection, a cross sectional area of an air intake  
passage opening, a supercharging pressure produced by a supercharger, and a flow rate of  
exhaust gas recirculated from the an exhaust passage to an air intake passage.

15 13. An engine exhaust cleaning device comprising:  
particulate matter collecting means for collecting particulate matter from exhaust  
gas in an exhaust passage;  
regeneration processing means for executing regeneration processing that raises  
temperature of the particulate matter collecting means to remove the particulate matter  
20 collected in the particulate matter collecting means by combustion of the particulate matter  
collected in the particulate matter collecting means; and  
idling speed raising means for raising the engine idling speed when the engine  
idles during the regeneration processing of the particulate matter collecting means by the  
regeneration processing means.

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